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## Service and system enhancements for TDMA digital cellular systems

Austin, M. Buckley, A. Coursey, C. Hartman, P. Kobylinski, R. Majmundar, M. Rai, J.P.

BellSouth Cellular Corp., Atlanta, GA, USA;

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### Abstract

Throughout 1998, the TDMA community investigated and defined an enhanced suite of voice services for TIA/EIA-136 while also improving its basic system capabilities. These enhancements, named 136+, provide improved voice quality, increased capacity, higher data rates, and improved system engineering. The enhancements are obtained by introducing a new modulation scheme, slot formats, and the addition of several new interleaving and coding options. As a result, the system supports a new vocoder mode, the GSM enhanced full-rate (US1) for improved fidelity at the IS-641 vocoder mode with a 4 dB BER enhancement on the IS-136 downlink, and a new packet data service capable of providing usable data rates of 14.4, 28.8, or 43.2 kb/s on a full-rate, double full-rate channel, respectively. The packet data service is truly evolutionary in nature, having a new control layer with a network layer very similar to that used for the existing digital control channel. This maximizes commonalities among TDMA technologies, using identical higher layers and reusing the general packet radio service specified in GSM. Furthermore, by using a concept known as GPRS, the TDMA system can pass TIA/EIA-136 messages through the GPRS network elements, the existing features of the system are maintained. This article provides an overview of these 136+ applications, as well as improvements, such as the ability to support six voice users per 30 kHz (IDMA6), downlink fast power control, and a new slot format.

### Index Terms

**Inspec****Controlled Indexing**

access protocols cellular radio digital radio diversity reception integrated voice communication message passing packet radio networks phase shift keying control telecommunication control time division multiple access vocoders

**Non-controlled Indexing**

136+ 14.4 kbit/s 28.8 kbit/s 4 dB 43.2 kbit/s 8-PSK BER enhancement cellular radio coding options data rates data services double full-rate channel downlink enhanced capacity fast power control fidelity full-rate channel genetic radio service interleaving medium access control layer message passing multiple access multiple channel packet data service service enhancement slot formats system enhancement triple full-rate channel tunneling usable data rates vocoder mode voice quality services

**Author Keywords**

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No references available on IEEE Xplore.

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